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Early postnatal maternal deprivation in rats causes long-lasting neurobiological effects

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Introduction: In rodents and other mammals, alterations of the infant-mother relationship cause long-term changes in the neurobiology and behavior of the offspring. Objective: Here, we investigated whether some of the cognitive aspects of these deficits might be related to repeated morphine administration and maternal deprivation in early life. Methods: 58 male Wistar rat pups were used in our study. From postnatal day 1 (P1), litters were daily deprived of their mother for 3 hours; this was continued for the first 10 days of life. Animals were divided into 5 groups: total control (C), did not receive any intervention; saline (S), received saline solution; morphine (M), received morphine; deprived-saline group (DS), were subjected to maternal deprivation and received saline solution; and deprived-morphine (DM), were subjected to maternal deprivation and received morphine. From P8, newborns received subcutaneous (s.c.) injections of morphine or saline (5 µg) once daily for 7 days. Social recognition task was performed; on day 1, a juvenile 20–25-day-old male rat was placed into the cage with the adult male rat for 30 min. Behavioral parameters analyzed were nosing and sniffing for 5 minutes. On day 2 (test), the animals within each condition were expose to the same juvenile that encountered to day 1 or were exposed to a different juvenile male and observed for the first 5 min of the interaction. Statistical analysis was performed by Generalized estimating equation (GEE) followed by Bonferroni. CEUA/HCPA: 15-0614. Results: The GEE showed interaction group * time (Wald $\chi 2 = 13.74$; 4, $P < 0.05$). At day one, M, DS and DM groups spend less time nosing and sniffing a previously unknown rat compared to C and S groups. At day two all the animals showed reduction in the spend time in the recognition task. However, deprivated animals showed a greater reduction of the total time spent nosing or sniffing compared to C, S and M group. Conclusion: Present results show the deleterious effect of maternal deprivation on social recognition, since it was accompanied by a reduction of time spent nosing or sniffing it on day 2, suggesting that animals deprived in the beginning of life lose interest in social life. It is important to note that neonatal maternal deprivation leads to long-term memory deficits. Our results, supports the evidence that disruption of mother–infant relationship in the developing brain period is detrimental to memory processes. Palavras-chaves: maternal deprivation, morphine, behavioral